AD-A143 491 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS MERIMERE RESERVOIR DA.. (U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV SEP 78 1/1

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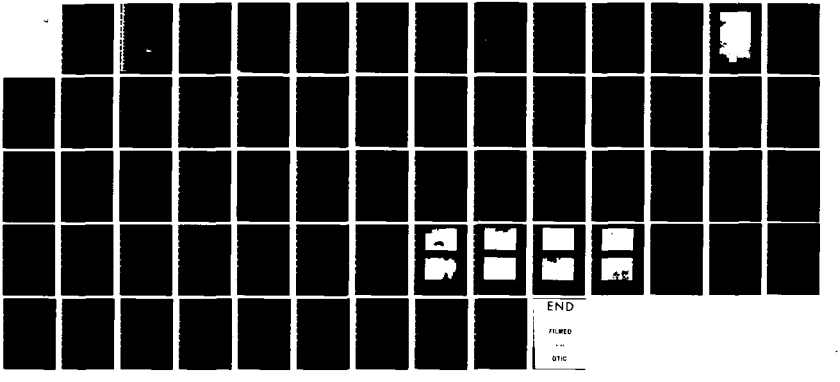

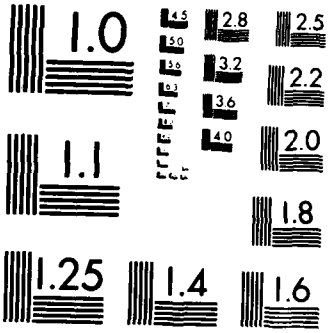

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

MATTABASSET RIVER BASIN
MERIDEN/BERLIN, CONNECTICUT

MERIMERE RESERVOIR DAM
CT. 00252

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

SEPTEMBER 1978

84

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Mattabassett River basin
Meriden/Berlin, Conn.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Merimere Reservoir Dam is an earth dam that is approx. 690 ft. long and 30 ft. high. It also has an emergency spillway. Based on visual inspection, records available at the site and past operational performance, the dam is judged to be in poor condition. The project spillway will pass only 12% of the estimated Probable Maximum Flood (PMF).

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED-E

MAY 23 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

I am forwarding for your use a copy of the Merimere Reservoir Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment which emphasizes the inadequacy of the project spillway under test flood conditions is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Merimere Reservoir Dam would likely be exceeded by floods greater than 12 percent of the Probable Maximum Flood (PMF), the test flood for spillway adequacy. Screening criteria for initial review of spillway adequacy specifies that this class of dam, having insufficient spillway capacity to discharge fifty (50) percent of the PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The classification of "unsafe" applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with "unsafe" classification applied for a structural deficiency. It does mean, however, that based on an initial screening and preliminary computations there appears to be a serious deficiency in spillway capacity. This could render the dam unsafe in the event of a severe storm which would likely cause overtopping and possible failure of the dam, significantly increasing the hazard potential for loss of life downstream from the dam.

NEDED-E
Honorable Ella T. Grasso

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy preciptiation, round-the-clock surveillance should be provided.

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. This report has also been furnished to the owner of the project, the City of Meriden, Meriden Water Department, Meriden, Connecticut 06450.

Copies of this report will be made available to the public, upon request to this office, under the Freedom of Information Act, thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for the cooperation extended in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification Number:	CT 00252
Name:	Merimere Reservoir Dam
Town:	Berlin
County and State:	Hartford County, Connecticut
Stream:	Stocking Brook
Date of Inspection:	July 25, 1978

BRIEF ASSESSMENT

The Merimere Reservoir Dam is an earth dam that is approximately 690 feet long and 30 feet high. It also has an emergency spillway.

Based on visual inspection, records available at the site and past operational performance, the dam is judged to be in poor condition. A review of the limited engineering data available reveals that there are areas of concern. The downstream side of the dam shows signs of fairly heavy seepage and as a result, it is felt that this condition should be investigated further.

The project spillway will pass only 12 percent of the estimated Probable Maximum Flood (PMF), the recommended spillway test flood. Therefore, further hydrologic and hydraulic studies are recommended to refine the test flood, determine the ability of the dam to withstand overtopping, and, if appropriate, recommend measures to increase the hydraulic capacity of the spillway.

Some recommended measures as described in Section 7 to be undertaken by the owner should include the establishment of metering points to monitor the condition of the dam, a systematic inspection program and a means of increasing the hydraulic capacity of the spillway. It is recommended that the owner implement these measures within one year after receipt of this Phase I Report.

Joseph F. Merluzzo
Connecticut P.E. #7639
Project Manager

Richard F. Lyon
Connecticut P.E. #8443
Project Engineer

This Phase I Inspection Report on Merimere Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

SAUL COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface evaluations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify the need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and varity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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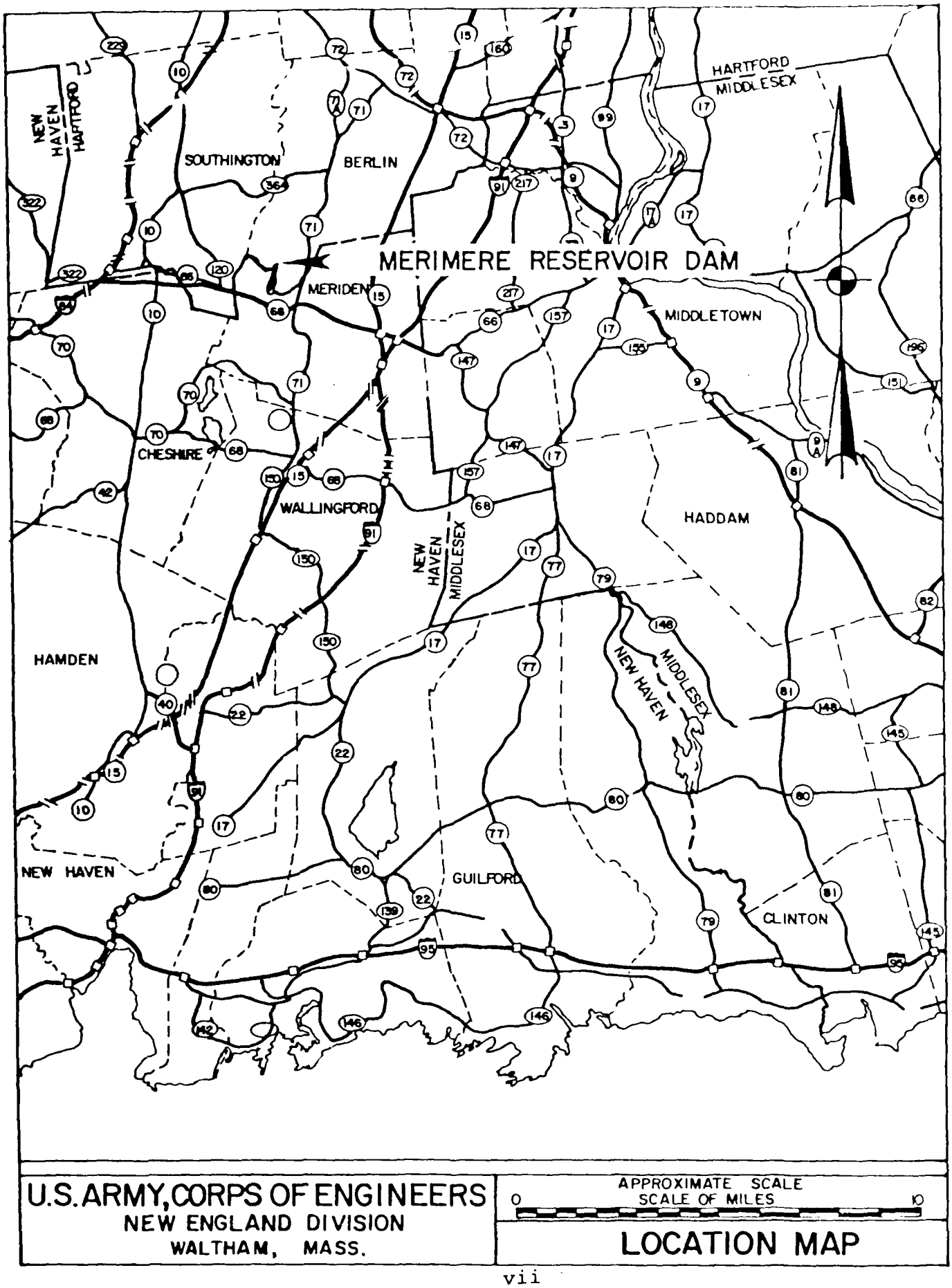

MERIMERE RESERVOIR DAM
NEW HAVEN HARTFORD
SOUTHINGTON
BERLIN
HARTFORD MIDDLESEX
MERIDEN
MIDDLETOWN
CHESHIRE
WALLINGFORD
NEW HAVEN MIDDLESEX
HADDAM
HAMDEN
NEW HAVEN
GUILFORD
CLINTON
NEW HAVEN MIDDLESEX
U.S. ARMY, CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASS.
APPROXIMATE SCALE
SCALE OF MILES
0
10
LOCATION MAP

PHASE I INSPECTION REPORT

MERIMERE RESERVOIR DAM

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority - Public Law 92-367, August 8, 1972 authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Storch Engineers has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Storch Engineers under a letter of May 3, 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0000 has been assigned by the Corps of Engineers for this work.

b. Purpose -

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and prepare the states to initiate quickly, effective dam safety programs for non-Federal dams.

(3) To updated, verify and complete the National Inventory of Dams.

1.2 Description of Project

The Merimere Reservoir Dam is one of 12 dams owned and operated by the Meriden Water Department, Meriden, Connecticut. It is located in the Town of Berlin, Hartford County, Connecticut (See Location Map) and is upstream of Stocking Brook in the Mattabassett River Basin.

The structure is an earth dam that is approximately 690 feet long with the spillway approximately 31 feet long. There is a dike at the opposite end of the reservoir (south end), which was not included in the scope of the inspection. The dam impounds the Merimere Reservoir which serves as a source of water supply for the greater Meriden area.

The size classification of the dam is intermediate (30 feet high and 1,220 acre-feet of storage) and the hazard classification is high per the criteria set forth in the Recommended Guidelines for Safety Inspection of Dams by the Corps of Engineers. Failure of this dam would result in the inundation of residential dwellings just downstream in the Town of Berlin (Appendix D, Plate 4).

The Merimere Reservoir Dam was constructed in 1870. There are neither design computations nor construction contract plans available. Regular maintenance personnel are assigned to the water treatment facility just below the south dike approximately one mile away from the Merimere Reservoir Dam.

The person in charge of day to day operation of the dam is Bruce Soroka, City Engineer, Meriden, Connecticut; Telephone Number: 634-0003.

1.3 Pertinent Data

a. Drainage Area - A 1.4 square mile drainage area contributes to the reservoir. The terrain is hilly and steep and completely forested.

b. Discharge at Damsite - The maximum known spillway discharge was approximately 600 cfs during the flood of September, 1938.

(1) Outlet works: size N/A at invert elevation: N/A.

(2) Maximum known flood at damsite: 600 cfs.

(3) Ungated spillway capacity at maximum pool elevation: 280 cfs at 398.83 elevation.

(4) Gated spillway capacity at pool elevation: N/A cfs at N/A elevation.

(5) Gated spillway capacity at maximum pool elevation: N/A cfs at N/A elevation.

(6) Total spillway capactiy at maximum pool elevation: 280 cfs at 398.83 elevation.

c. Elevation (Feet above MSL)

(1) Top of dam: 398.83

(2) Maximum pool-design surcharge: N/A

(3) Full flood-control pool: N/A

(4) Recreation pool: N/A

(5) Spillway crest: 396.62

(6) U/S portal, invert diversion tunnel: N/A

(7) Streambed at centerline of dam: 368.0

(8) Maximum tailwater: 2.0 feet ± deep

d. Reservoir

(1) Length of maximum pool: 4,800 feet ±

(2) Length of recreation pool: N/A

(3) Length of flood-control pool: N/A

e. Storage (Acre-Feet)

(1) Recreation pool: N/A

(2) Flood-control pool: N/A

(3) Design surcharge: N/A

(4) Top of dam: 1,220

f. Reservoir Surface (Acres)

(1) Top of dam: 59.0 ±

(2) Maximum pool: N/A

(3) Flood-control pool: N/A

(4) Recreation pool: N/A

(5) Spillway crest: 58.5

g. Dam

(1) Type: Earth embankment

(2) Length: 686 feet ±

(3) Height: 30 feet ±

(4) Top width: 20 feet ±

(5) Side Slopes: varies 1:2.5 to 1:1.6

(6) Zoning: Unknown

(7) Impervious core: clay

(8) Cutoff: Unknown

(9) Grout curtain: Unknown

(10) Other: N/A

h. Diversion and Regulating Tunnel

(1) Type: N/A

(2) Length: N/A

(3) Closure: N/A

(4) Access: N/A

(5) Regulating Facilities: N/A

i. Spillway

(1) Type: brownstone block - fixed weir

(2) Length of weir: 31.33 feet

(3) Crest elevation: 396.62 feet

(4) U/S Channel: 20 feet wide; 80 feet long-
channel cut in rock

(5) D/S Channel: earth channel (partially rock lined)

(6) General: N/A

j. Regulating Outlets

There are no regulated outlets for this dam.

(1) Invert: N/A

(2) Size: N/A

(3) Description: N/A

(4) Control Mechanism: N/A

(5) Other: N/A

SECTION 2 - ENGINEERING DATA

2.1 Design

The facility was built in 1870. There is no design information available. The City of Meriden, Engineering Department in 1895 calculated the capacity of the reservoir (Appendix B, Reference 2) and in 1969 performed a topographic survey including cross sections of the reservoir in the area of the dam (Appendix B, Reference 3).

2.2 Construction

There are no records or photographs available of the 1870 construction.

2.3 Operation

The water level in this reservoir is controlled by valves that are in the gate house at the south dike of the reservoir. There is no mechanical operation of the dam.

2.4 Evaluation

a. Availability - Topographic drawings by the Meriden Water Department were readily available. Because of the age of the dam, there was no design information. The dam has no procedures in case of overtopping.

b. Adequacy - The information that was made available was only a minor factor in the assessment which was based

mainly on the visual inspection, past performance history and hydrologic and hydraulic assumptions.

c. Validity - The topographic drawings are accurate to the extent that the visual inspection did not reveal any new features.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General - The visual inspection was conducted in the afternoon of July 25, 1978 by members of the engineering staff of Storch Engineers. A copy of the visual check list is contained in the Appendix of this report.

The following procedures were used for the inspection:

1. Inspection of the crest for settlement or irregularities.
2. A walking survey of the drainage areas adjacent to or contributing to the reservoir.
3. Location of areas or zones of seepage at the toe of the dam and estimation of the amount of flow being discharged.
4. Definition and evaluation of the spillway and its downstream channel.
5. Take photographs of the general view of the dam and other items that received attention during the inspection.

Before the inspection, cross sections of the dam that had recently been done as well as other hydrologic information that was made available from the Meriden Engineering Department was studied. A compact sketch of the dam was made for orientation during the inspection (Appendix B, Plate 1).

In general, the overall appearance and condition of the dam is poor.

b. Dam - According to the data sheet supplied from the City of Meriden, Engineering Department, the body of the dam is composed of earth fill with a clay core. The crest of the dam has a road which goes to the upper reaches of Hubbard Park. This road has a rolled surface which needs repair. The survey completed by the Meriden Engineering Department in 1969, showed a two foot settlement of the crest of the dam since its construction. The banks are covered with trees Appendix C, Photos 1 and 2). Inspection of the east side of the toe showed no evidence of seepage, however, the middle two thirds had several marshy areas. Some of these spots had fairly substantial flows which are shown in Photos 7 and 8, Appendix C. There were no areas of major distress but it was very clear that a considerable amount of water is being lost and that potentially there could be a very unsafe condition.

c. Appurtenant Structures - The appurentant structures are the spillway and the service bridge over the spillway channel. The brownstone block spillway was difficult to find since it is covered with a considerable amount of brush. Its condition is fair but there is need of some

restoration. The service bridge has an opening of approximately 7' x 28' and the concrete beams are in remarkably good condition. There were no evidences of major cracks or spalling noted.

d. Reservoir Area - Inspection of the area adjacent to the embankment of the dam showed it to be generally very rocky and a steep terrain. There were no visible signs of rock slides or embankment movement at either end of the dam.

e. Downstream Channel - The downstream channel of the spillway is overgrown with trees and is very difficult to define its actual location. The channel seems to follow the natural fall and presently has no form of slope protection. It stays moist from the seepage flows out of the body of the dam.

3.2 Evaluation

The observation of the extensive zone of seepage on the downstream slope of the dam indicates a need for further study so that the extent of this problem can be defined.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

The responsibility for maintenance is with the Water Department of the City of Meriden with engineering and construction assistance from the Public Works Department. There is no formal procedure for lowering the reservoir during seasons of heavy rain. The reservoir is essentially filled during the wet seasons and low during the dry seasons. Water for the City of Meriden is constantly being drawn from it through a main at the south dike to the treatment plant.

4.2 Maintenance of Dam

There is no routine maintenance, however, some attempts have been made to keep the roadway and bridge in passable condition. Items such as clearing the downstream and upstream embankment of trees and brush have not been undertaken for years. Also maintenance of the spillway channel and weir has been negligible.

4.3 Maintenance of Operating Facilities

There are no operating facilities.

4.4 Description of Warning System

There is no warning system in effect.

4.5 Evaluation

In view of the lack of routine maintenance procedures, it is suggested that a complete program of maintenance procedures be established. There has been no recent effort made to clean-up the downstream area or to repair damage to the body of the dam itself.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data - The 31 foot spillway is the only means of transmitting water past the dam. Under conditions of the Probable Maximum Flood (PMF), the spillway will only carry a portion of the flood water.

Using the guide curves supplied by the Corps of Engineers (mountainous) the PMF inflow is 3,300 cfs and the routed outflow is 2,320 cfs. The pond elevation at the PMF is 400.2 or 1.43 feet over the top of the dam. The existing spillway capacity is only about 280 cfs or approximately 12 percent of the PMF adopted for this study, (Appendix D).

b. Experience Data - The Merimere Reservoir Dam has experienced the floods of December, 1878; March, 1896; November, 1927; March, 1930; September, 1938 (maximum) and August and October, 1955. During the flood of September, 1938, the discharge was approximately 720 cfs.

c. Visual Observations - The spillway at the time of inspection was in fair condition. The weir and the spillway channel for approximately 50 feet was heavily overgrown with brush and trees.

d. Overtopping Potential - Calculations for this study indicate that the PMF will overtop the dam by 1.43 feet. The dam apparently has experienced previous overtopping and kept its structural integrity.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observation - There are no routine inspections conducted by the staff of the Meriden Water Department. This visual inspection discovered an intensive zone of seepage through the body of the dam which causes concern about its structural stability in the future.

b. Design and Construction Data - The only design and construction data available were two drawings prepared by the Engineering Department of the City of Meriden in 1969 and 1970.

c. Operating Records - There are no operating records for the dam. The water level of the Merimere Reservoir is not monitored.

d. Post Construction Changes - The following changes have been noted since the completion of construction in 1873:

1. Extensive seepage sources in the central portion of the downstream slope of the dam with the total discharge of approximately 5 to 10 gallons per second. As a result, there is soft and spongy area over a considerable part of the downstream toe (Appendix B, Plate 1).

2. Depression of the central portion of the dam crest, measured in 1969, was nearly two feet.

e. Seismic Stability - The dam is located in Seismic Zone 1 and in accordance with Recommended Phase I Guidelines does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - After consideration of the available documents, the results of this inspection and the meetings with resident staff, the general condition of the Merimere Reservoir Dam is judged to be poor.

Extensive seepage through the body of the dam, the considerable depression of its central portion and the insufficient capacity of the spillway channel could lead to a hazardous condition in the future.

b. Adequacy of Information - The information available is such that the assessment of the safety of the dam should be based primarily on the visual inspection results and its past operational performance.

c. Urgency - It is considered that the recommendations suggested below be implemented within one year after receipt of this Phase I Inspection Report.

d. Need for Additional Investigation - Additional observations and investigations of the dam should be implemented. Since there are no evidences that formal structural and hydraulic analyses were ever performed, primary attention

should be given to the definition of seepage discharges within the pervious zones of the dam, the reinforcement of the body of the dam and the increasing of the hydraulic capacity of the spillway.

7.2 Recommendations

In view of the lack of engineering data for evaluating the dam's behavior, it is recommended that the following measures be undertaken by the owner:

1. The installation of instrumentation should be provided as early as practical to monitor the dam condition. This instrumentation should include metering of:
   a. Upstream and downstream water level, daily;
   b. Seepage discharges in the springs on the central portion of the downstream zone of the dam, monthly. Arrangements for meterings of seepage discharges (gutter, manholes, measuring weirs), should be installed;
   c. Seepage pressure within the body and at the base of the dam by piezometers, monthly;
   d. Temperature of seepage water and reservoir water at the depth of one foot and also near reservoir bottom, monthly, and simultaneously with mesaurement of seepage discharges;

e. Settlement of the crest of the dam, yearly. Surface movement monuments at intervals of 150-200 feet along the crest of the dam should be installed.

2. Sketches and photographs of the damaged surfaces (cavities, erosion areas, cracks) of the top upstream slope (under the lower reservoir level) and downstream slope of the dam, yearly.

3. Determination of the exact geometrical size of the dam, elevations of its base, properties of the earth and clay core of the dam and its foundation. This would permit an objective assessment of the structural stability of the dam.

4. Make an evaluation of possible ways to stop or minimize the seepage flow through the body of the dam.

5. A systematic inspection program (once every two years) during periods of the highest and lowest reservoir water levels to assure that all features of the dam are continually maintained.

6. The spillway should be reconstructed for the safe passage of the PMF.

Detailed information on field instruments, installation and operations is given in Reference 8, Appendix B.

Any of the above recommendations that require additional investigation and observation should be done by a qualified engineering firm.

7.3 Remedial Measures

It is considered important that the following items be attended to as early as practical.

a. Alternatives - Not applicable.

b. O & M Maintenance and Procedures -

1. Grass, brush and trees on the upstream and downstream slopes of the dam should be removed to facilitate the visual observation of existing and potential seepage and movement.

2. Loose materials, rock deposits and brush should be cleaned from the spillway channel.

3. Plans for around-the-clock surveillance should be developed for periods of unusually heavy rains and a formal warning system should be developed for use in the event of an emergency.

APPENDIX A

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Merimere Reservoir Dam

DATE 7-25-78

TIME

WEATHER Sunny

W.S. ELEV. 386.3 U.S. N/A DN.S.

PARTY:

1. Richard Lyon
2. Miron Petrovsky
3. Gary Giroux
4. John Schearer
5.
6.
7.
8.
9.
10.

PROJECT FEATURE	INSPECTED BY	REMARKS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Temperature of Air 80° F

Temperature of Water 78.8° F (upstream)

PERIODIC INSPECTION CHECK LIST

PROJECT Merimere Reservoir Dam DATE 7-25-78

PROJECT FEATURE _____ NAME R. Lyon

DISCIPLINE _____ NAME G. Giroux

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	Good
Current Pool Elevation	Good
Maximum Impoundment to Date	Good
Surface Cracks	None observed
Pavement Condition	Good
Movement or Settlement of Crest	Some settlement approximately 2' at center of dam
Lateral Movement	None observed
Vertical Alignment	None observed
Horizontal Alignment	None observed
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	N/A
Trespassing on Slopes	Not patrolled
Sloughing or Erosion of Slopes or Abutments	None observed
Rock Slope Protection - Riprap Failures	None observed
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	Intensive (1 cfs.)
Piping or Boils	None
Foundation Drainage Features	None
Toe Drains	None

PERIODIC INSPECTION CHECK LIST

PROJECT Merimere Reservoir Dam DATE 7-25-78

PROJECT FEATURE _____ NAME M. Petrovsky

DISCIPLINE _____ NAME J. Schearer

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	Few
Floor of Approach Channel	Good
b. Weir and Training Walls	Overgrown with brush
General Condition of Concrete	Good
Rust or Staining	None
Spalling	N/A
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	Dry
Drain Holes	None
c. Discharge Channel	
General Condition	Fair to good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Some
Floor of Channel	Loose rock
Other Obstructions	Brush and trees

APPENDIX B

LIST OR REFERENCES

1. "Engineering Data of Dams of Meriden Water Department"; City Engineers' Office; Meriden, Connecticut.

2. "Hydrological Data of Capacity of Merimere Reservoir measured November, 1895"; City Engineers' Office; Meriden, Connecticut.

3. Two Drawings; Map of Merimere Reservoir, Meriden/ Berlin, 1969; Cross Sections North Dam of Merimere Reservoir, 1970; City Engineers' Office; Meriden, Connecticut.

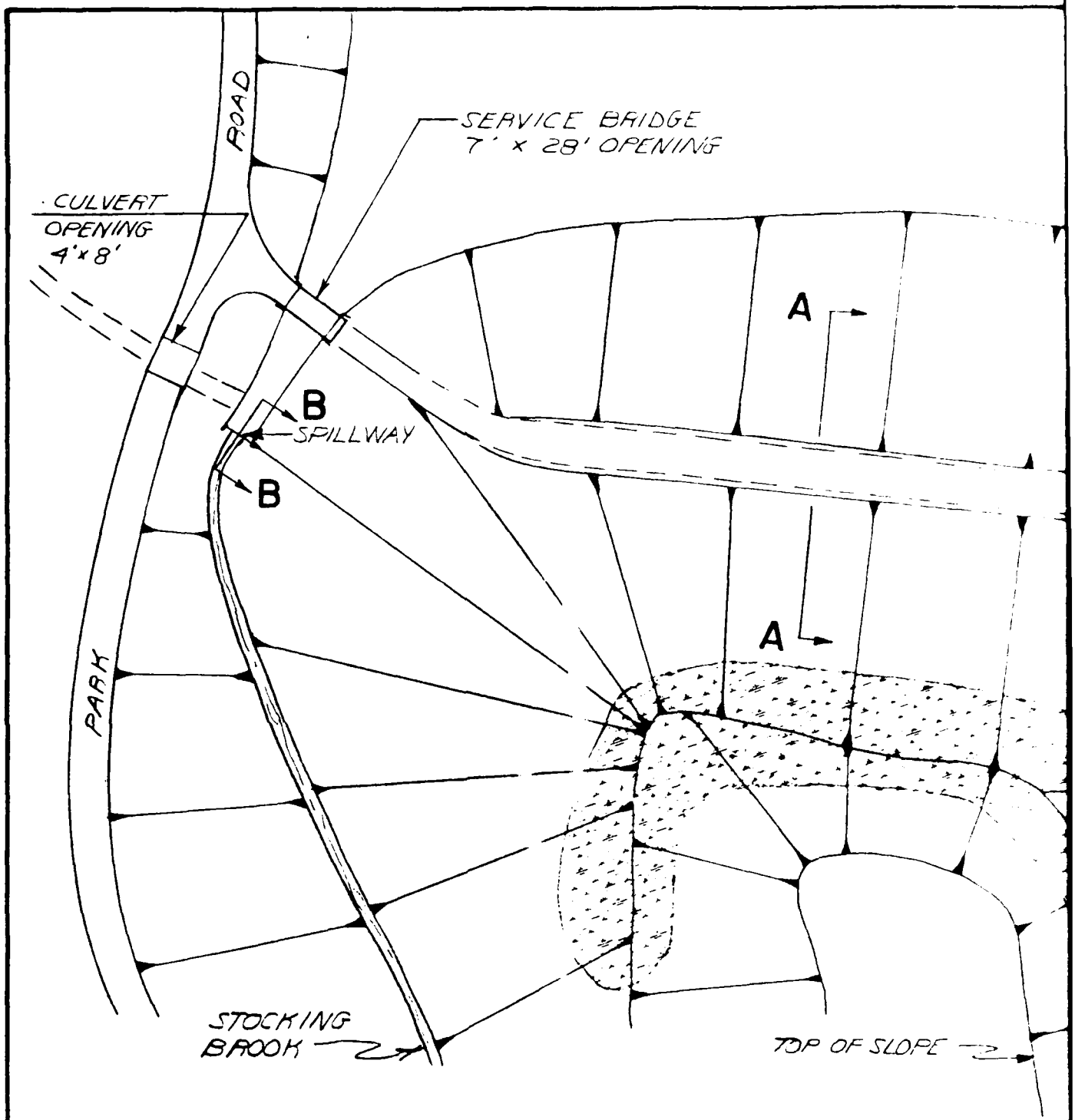
4. Recommended Guidelines for Safety Inspection of Dams; Department of the Army; Office of Chief of Engineers; Washington, D.C.; November, 1976.

5. Guide Curves for the Probable Maximum Flood (PMF) for Regions of New England Based on past Corps of Engineers studies; March, 1978.

6. Preliminary Guidance for Estimating Maximum Probable Discharges in Phase I Dam Safety Investigations; New England Division; Corps of Engineers; March, 1978.

7. Rule of Thumb. Guidance for Estimating Downstream Dam Failure Hydrographs; Corps of Engineers; April, 1978.

8. Instrumentation of Earth and Rockfill Dams. EM 110-2-1908; 31 August 1971; Department of the Army; Corps of Engineers.



NOTE

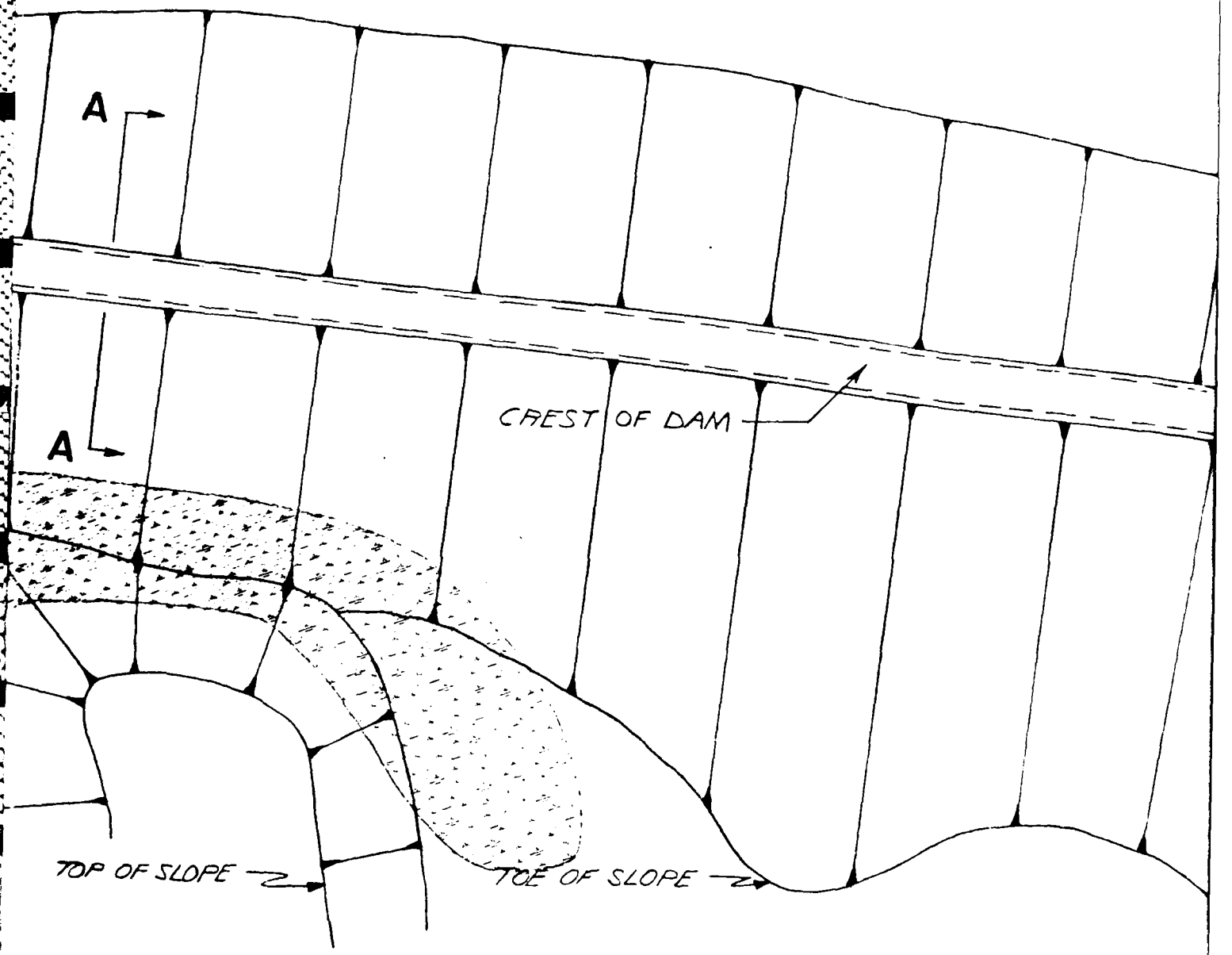
INFORMATION TAKEN FROM PLANS SUPPLIED BY MERIDEN ENGINEERING DEPARTMENT

NO

DENOTES APPROXIMATE LIMITS OF SOFT WET AREA

(1)

MERIMERE RESERVOIR



PLAN

NOT TO SCALE

SUPPLIED
PARTMENT
OF

STORCH ENGINEE
WETHERSFIELD, CONNE
NATIONAL PROGRA
MERIM
STOCKING BROOK

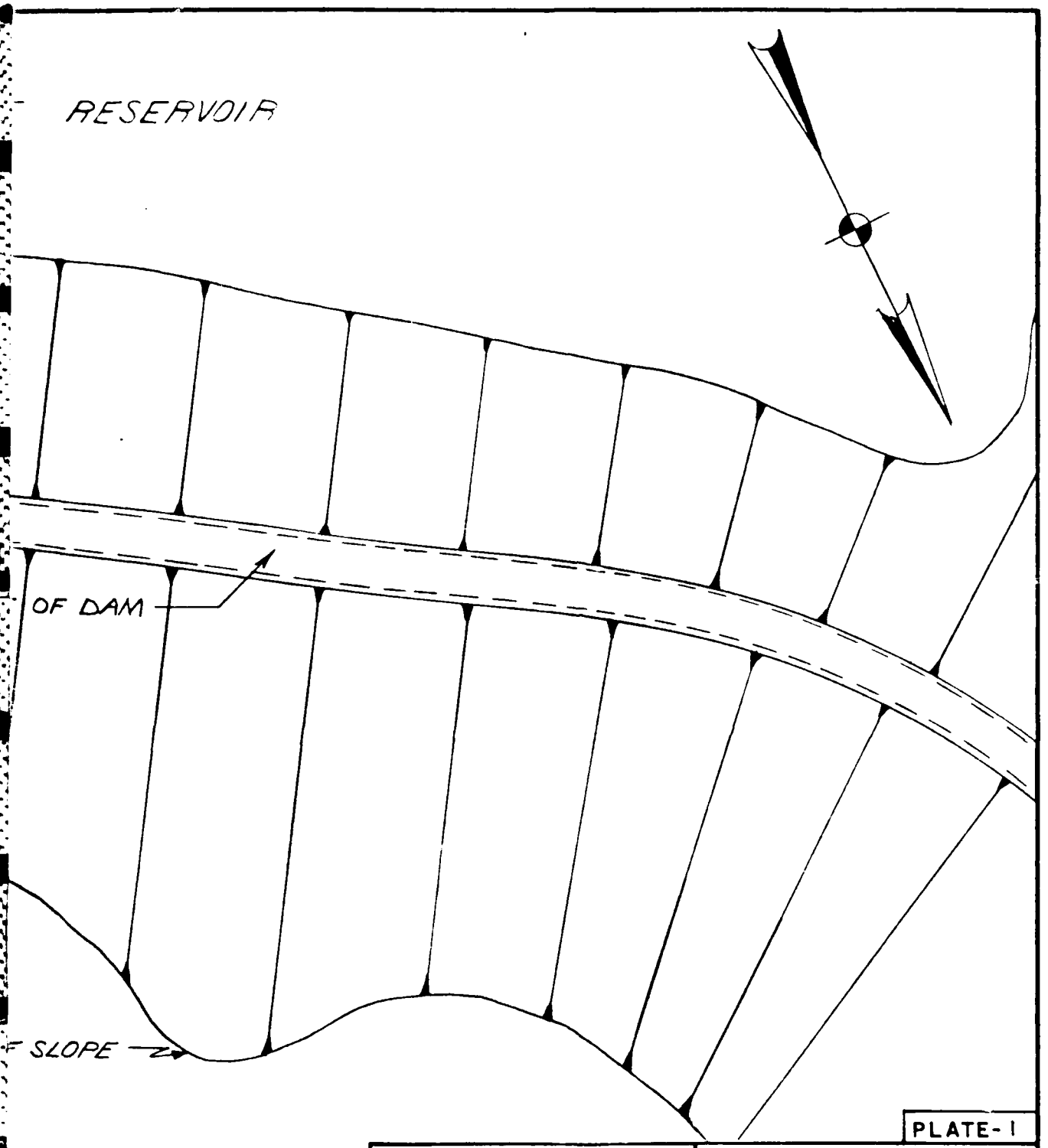


PLATE-1

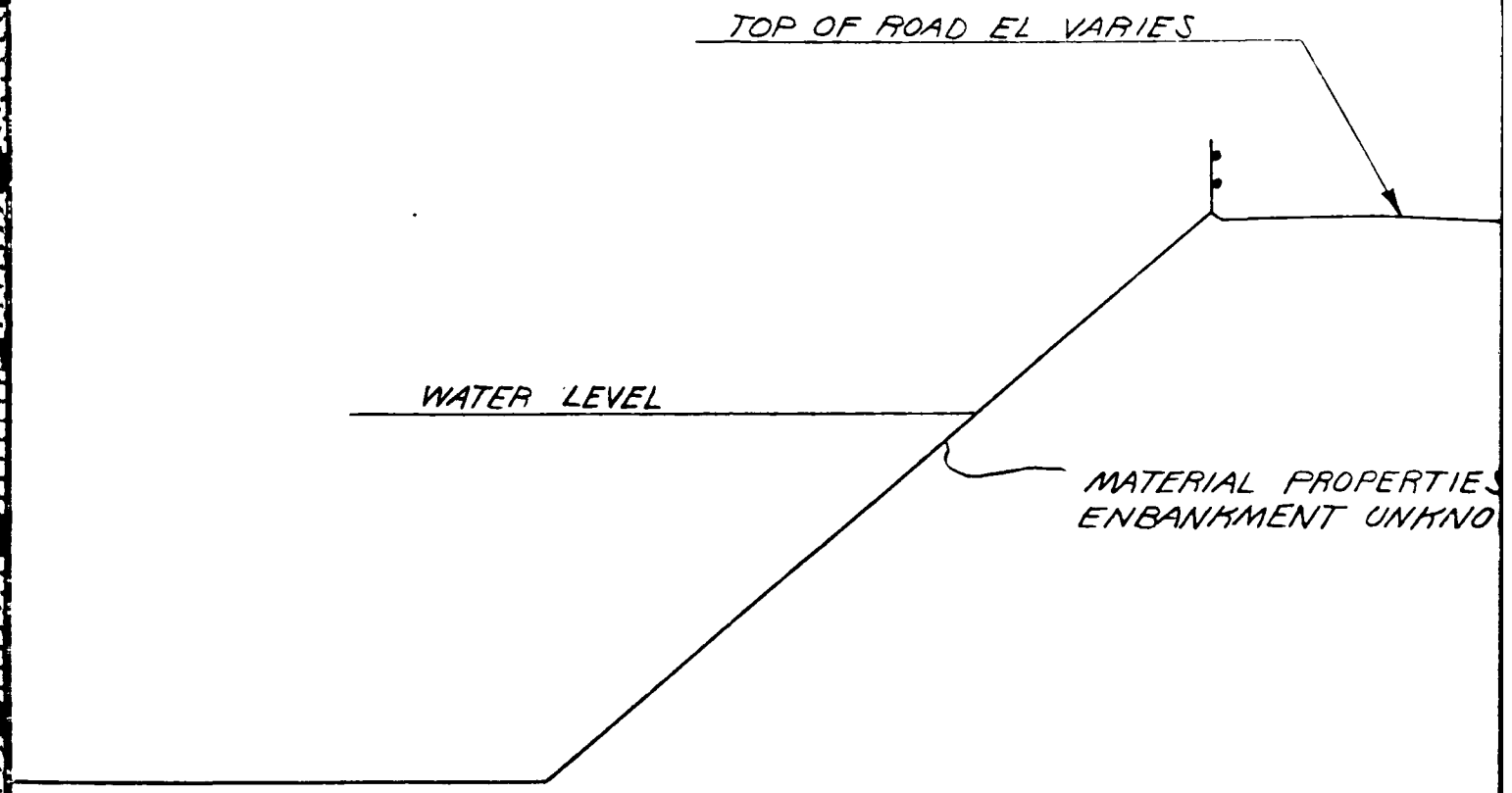
STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

MERIMERE RESERVOIR DAM

STOCKING BROOK 3 CONNECTICUT

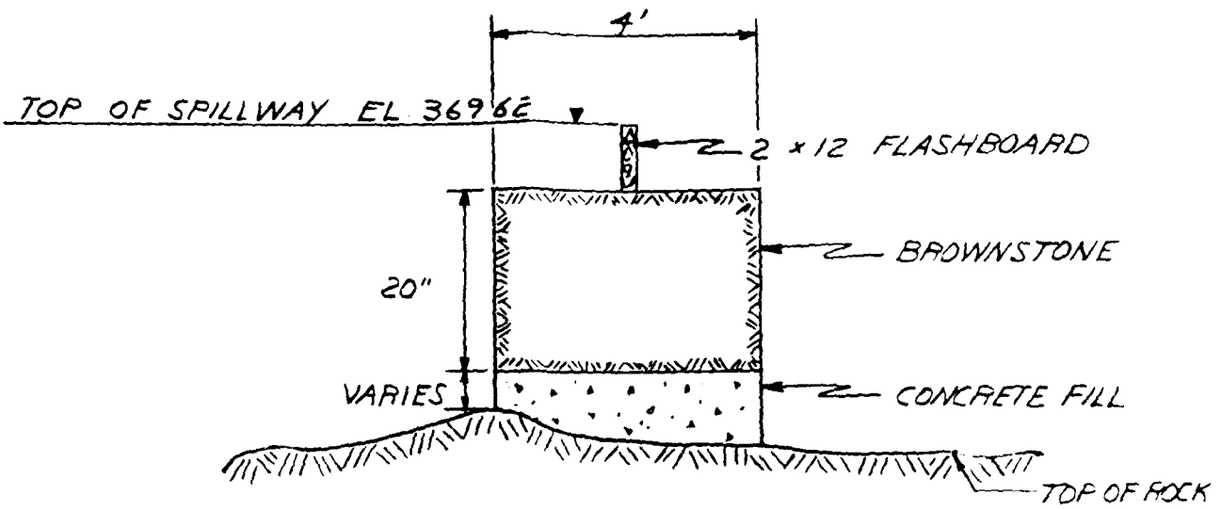
			SCALE: AS SHOWN
			DATE : AUGUST 1978



SECTION

SCALE 1" = 1

NOTE:
INFORMATION TAKEN FROM DRAWINGS SUPPLIED BY
MERID. V ENGINEERING DEPARTMENT



SECTION B-B

SCALE 3/8" = 1'

OF
WN

A-A

PLATE-2

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

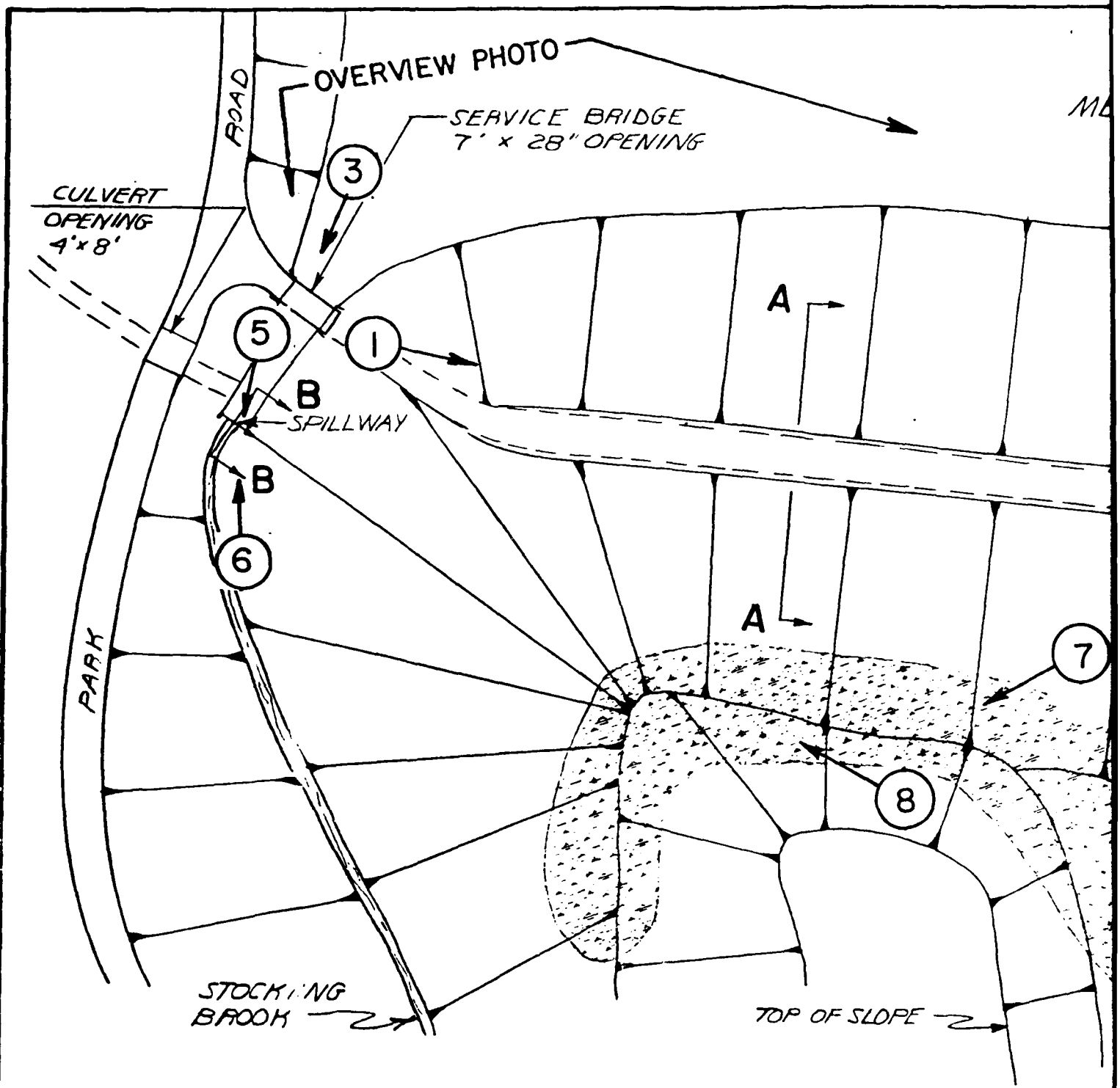
MERIMERE RESERVOIR DAM

STOCKING BROOK CONNECTICUT

SCALE: AS SHOWN

DATE : AUGUST 1978

APPENDIX C



PL

NOT TO

NOTE:

INFORMATION TAKEN FROM PLANS SUPPLIED BY MERIDEN ENGINEERING DEPARTMENT

DENOTES APPROXIMATE LIMITS OF SOFT WET AREA

6 → DENOTE

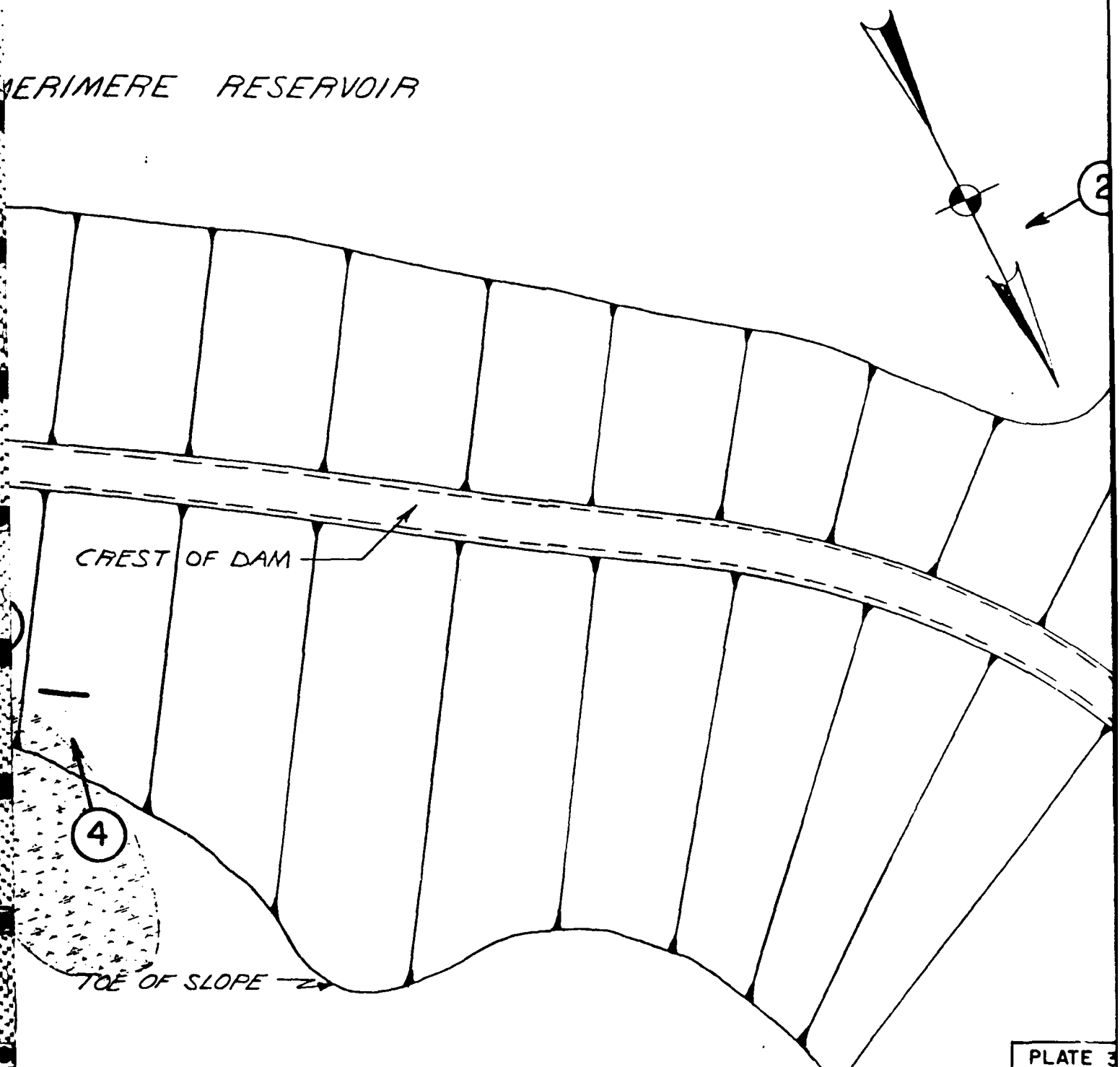


PLATE 3

AN

SCALE

ES PHOTO LOCATION

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

MERIMERE RESERVOIR DAM

STOCKING BROOK CONNECTICUT

SCALE: AS SHOWN

DATE : AUGUST 1978

PHOTO 1

ROADWAY ON CREST OF DAM

PHOTO 2

UPSTREAM FACE OF DAM

PHOTO 3

SERVICE BRIDGE LOOKING DOWNSTREAM

PHOTO 4

HEADWALL AT DOWNSTREAM FACE OF DAM

PHOTO 5

SPILLWAY FROM UPSTREAM AREA

PHOTO 6

SPILLWAY FROM DOWNSTREAM AREA

PHOTO 7

SEEPAGE AREA AT TOE OF DAM

PHOTO 8

SEEPAGE AREA AT TOE OF DAM

APPENDIX D

STORCH ENGINEERS
Engineers · Landscape Architects
Planners · Environmental Consultants

MERIMERE RESERVOIR DAM
STAGE DISCHARGE

SEE PLATES & FOR PLAN & ELEVATION

SPILLWAY
$Q = CLH^{3/2}$

ELEV	H	C	L	Q
396.62	0	0	31.33	0
397.62	1.0	2.67		84.0
398.62	2.0	2.68		240.0
399.62	3.0	2.73		446.0
400.62	4.0	2.79		700.0
401.62	5.0	3.07		1076.0
402.62	6.0	3.5		1610.0
403.62	7.0	3.5		2030.0
404.62	8.0	3.5		2480.0

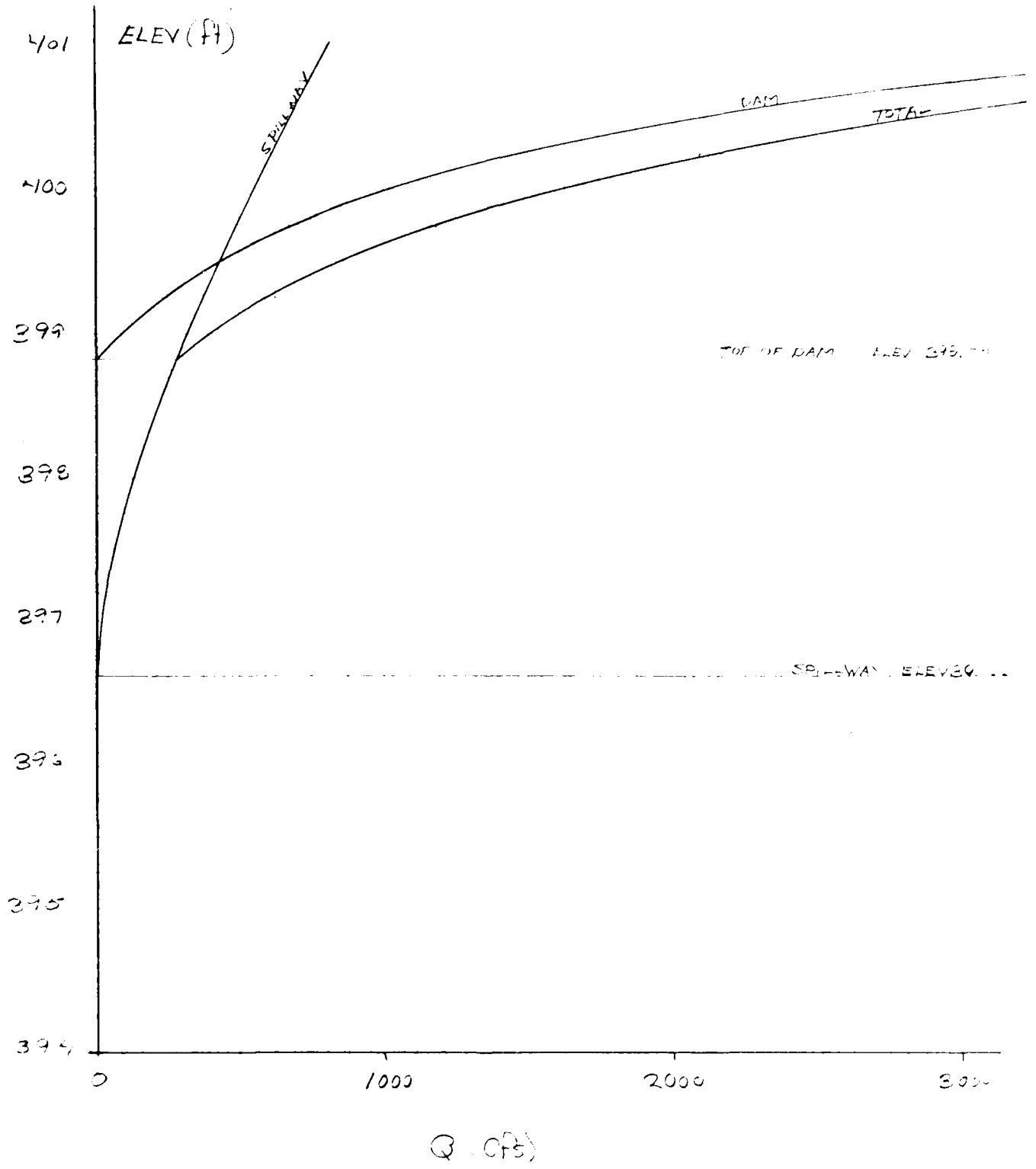
TOP OF DAM
$Q = CLH^{3/2}$

ELEV 398.83

ELEV	H	C	L	Q
398.83	0		310	0
399.33	0.5	2.7		296
399.83	1.0	2.63		815
400.33	1.5			1500
400.83	2.0			2300
401.33	2.5			3200
401.83	3.0			4200
402.33	3.5			6500
403.33	5.0			9100
404.83	6.0			12400

ELEV 399.83

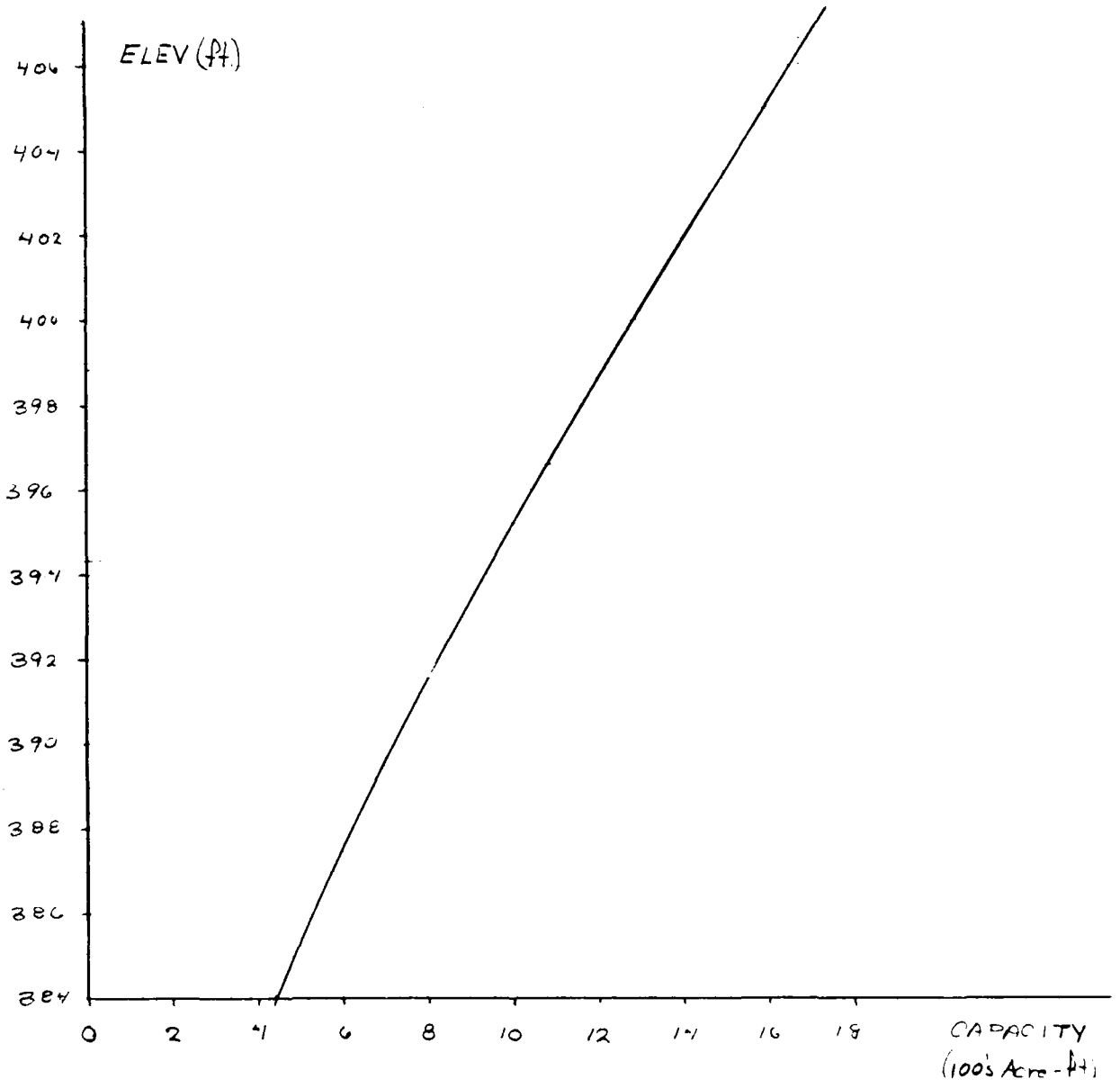
H	C	L	Q
		410	
0			0
0.5	2.7		390
1.0	2.63		1100
1.5			2000
2.0			3050
3.0			5600
4.0			9000
5.0			12000


ELEV (ft)
401
400
399
398
397
396
395
394
SPILLWAY
DAM
TOTAL
TOP OF DAM ELEV 399.
SPILLWAY ELEV 39
0
1000
2000
3000
Q (cfs)

STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

MERIMERE RESERVOIR DAM
CAPACITY CURVE

ELEV	DEPTH	AREA	AVG. AREA	VOL.	Σ VOL. (Acre-ft)
384					443
396.62		58.52			1094
	10		58.52	585.2	
406.62		58.52			1680



METIMERE RESERVOIR DAM
DETERMINATION OF SDF & PMF

DRAINAGE AREA - 1.4 SM

INFLOW (Ref) - 2750 cfs/SM

PMF = 2750(1.4) = 3850 cfs

Determine the effect of surcharge storage on Maximum Probable Discharge (Ref.)

① Q_{P1} = 3850 cfs

② a. H_1 = 400.75' (Elev)

b. $STOR_1$ 3.35"

c. $Q_{P2} = Q_{P1}(1 - STOR/19) = 3850(1 - 3.35/19) = 3171$ cfs

③ a. H_2 = 400.6 (Elev)

$STOR_2$ = 3.15"

b. $STOR_A$ = 3.20"

$Q_{P3} = 3850(1 - 3.25/19) = 3190$ cfs

H_3 = 400.65' (Elev)

PMF = 3190 cfs

Capacity of spillway below top of dam Elev 398.83

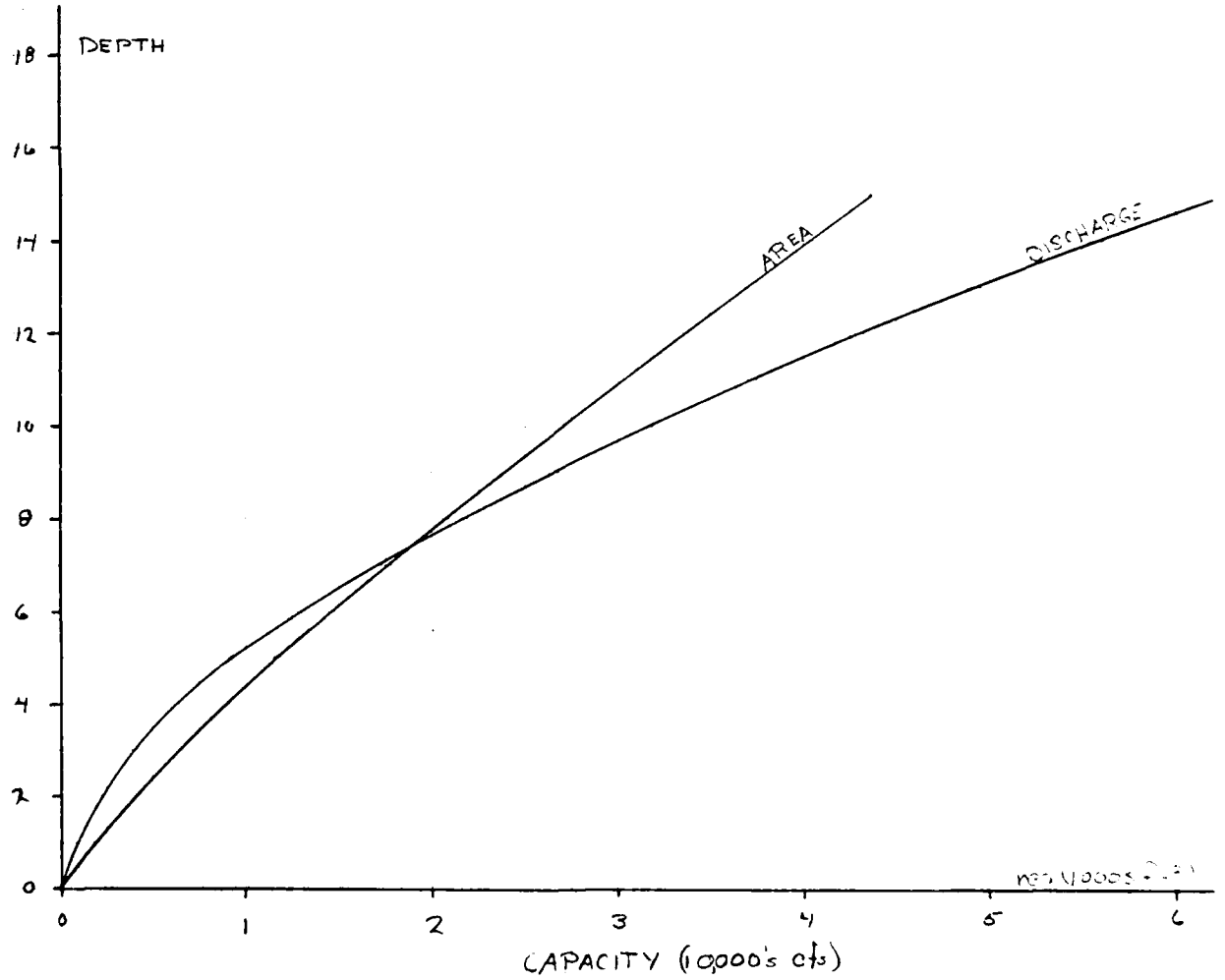
Q = 475 cfs or 14.9% of PMF

STORCH ENGINEERS
Engineers - Landscape Architects
Planners - Environmental Consultants

MERIMERE RESERVOIR DAM
TYPICAL SECTION

n=.035 S=0.50%

D	WP	A	R	$R^{2/3}$	$S^{1/2}$	V	Q
5	260	1160	4.42	2.69	.07	7.99	9,190
10	340	2700	7.94	3.98	.07	11.82	31,950
15	410	4360	10.61	4.83	.07	14.35	62,550
20	500	6700	13.4	5.65	.07	16.79	112,500



'RULE OF THUMB' GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS

SECTION I @ Dam

① $S = 12250$ Ac-ft

② $Q_p = 8/27\ W_b\sqrt{g}\ Y^{3/2} = 8/27\,(100)\sqrt{32.2}\,(30)^{3/2} = 44{,}200$ cfs

SECTION II @ Park Drive #2, Berlin

③ See Rating Curve

④ a. $H_1 = 12.25'$ $A_1 = 3400$ $L_1 = 5{,}000'$

$V_1 = 390$ Ac ft

b. $Q_{P2} = 44200\,(1 - 390/1225) = 30130$ cfs

c. $H_2 = 9.75'$ A_2 2650

$A_{avg} = 3025$, $V_{avg} = 347$ Ac ft

$Q_{P2} = 44200\,(1 - 347/1225) = 31{,}680$ cfs

$H_2 = 10.0'$ $A_2 = 2700$ ft²

SECTION III @ Pipeline crossing, Berlin

④ a. $H_2 = 10'$ $A_2 = 2700$ ft² $L = 4000'$

$V_2 = 248$ Ac ft

b. $Q_{P3} = 31680\,(1 - 248/1225) = 25{,}270$ cfs

c. $H_3 = 8.8'$ $A_3 = 2300$ ft²

$A_{avg} = 2500$ ft² $V_{avg} = 230$ Ac ft

$Q_{P3} = 31680\,(1 - 230/1225) = 25{,}730$ cfs

$H_3 = 8.9'$ $A_3 = 2350$ ft²

SECTION IV @ Redwood Rd., Berlin

④ a. $H_3 = 8.9'$ $A_3 = 2350$ ft² $L = 12000$ ft

$V_3 = 647$ Ac ft

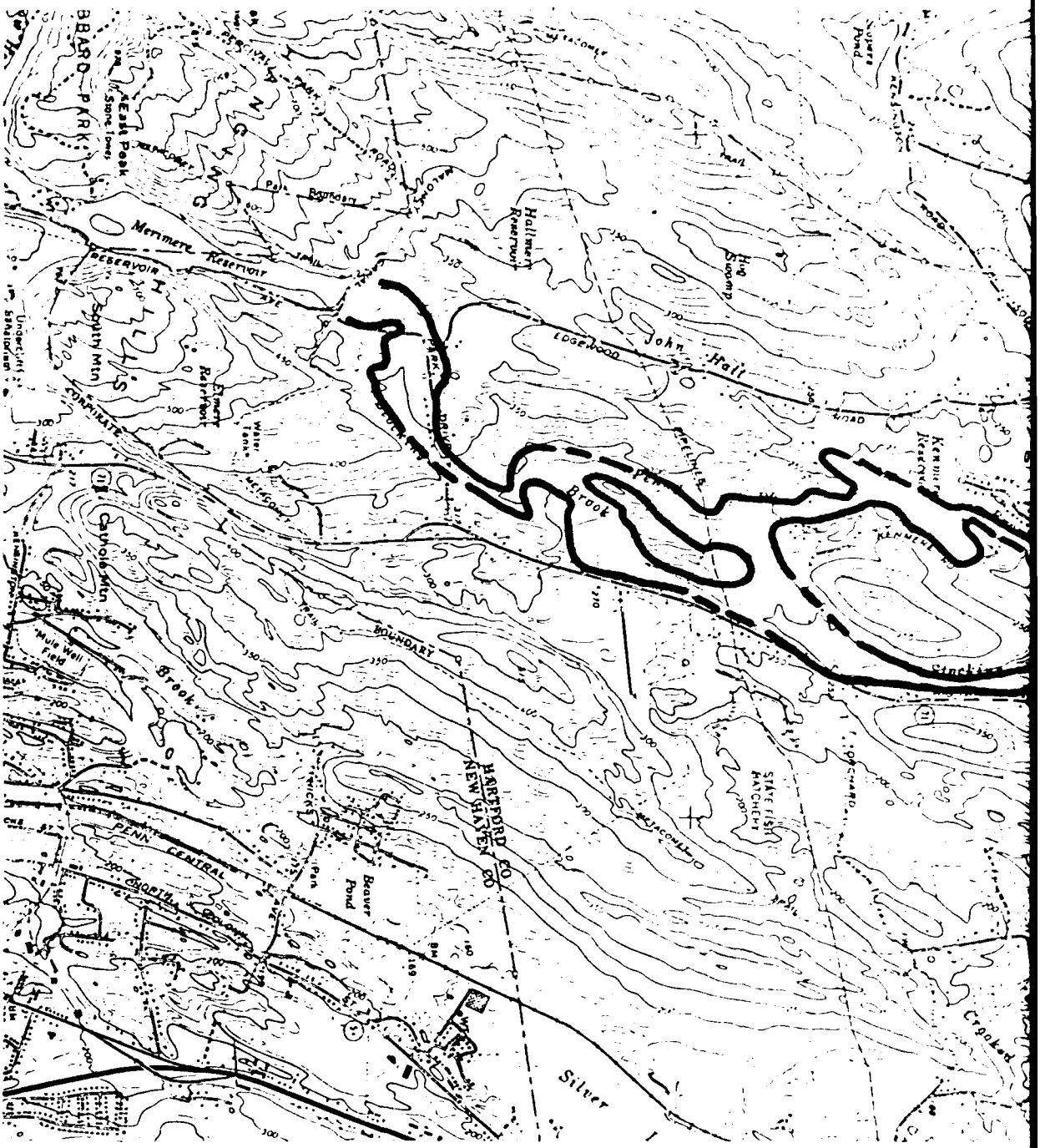
b. $Q_{P4} = 25730\,(1 - 647/1225) = 12{,}140$ cfs

c. $H_4 = 5.9$ $A_4 = 1420$ ft²

$A_{avg} = 1885$ ft² $V_{avg} = 529$ Ac ft

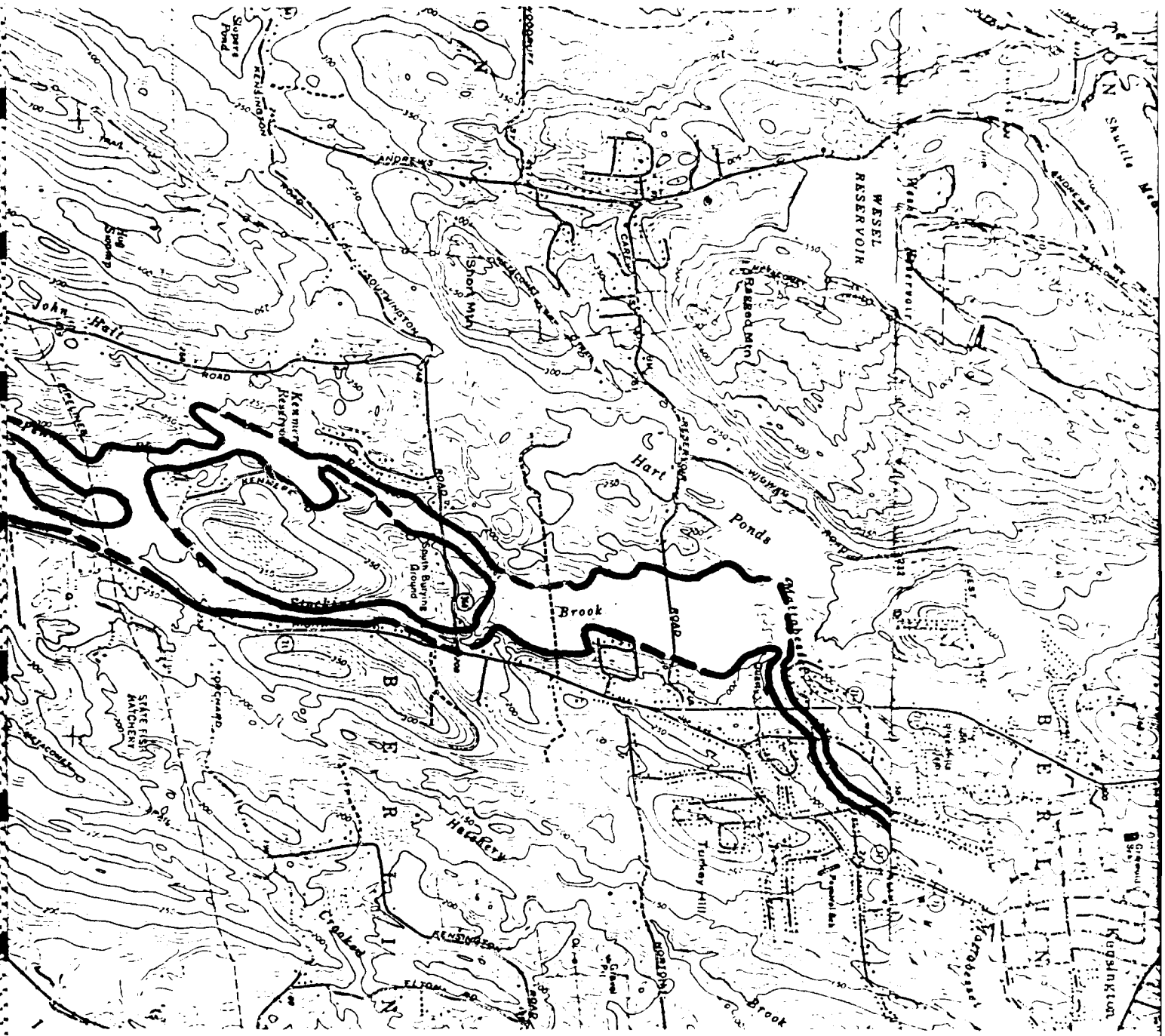
$Q_{P4} = 25730\,(1 - 529/1225) = 14{,}610$ cfs

$H_4 = 6.25'$



LEGEND

DENOTES LIMITS OF FLOODING IN CASE OF DAM FAILURE



REGIONAL VICINITY MAP

SCALE 1:24000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

DATUM IS MEAN SEA LEVEL

FLOODING
LURE

STORCH	
WETHERS	
NATIONAL	
STOCKING	

TY MAP

1 MILE

1000 0 1000 2000 FEET

1 KILOMETER

PLATE-4

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

MERIMERE RESERVOIR DAM

STOCKING BROOK CONNECTICUT

SCALE: AS SHOWN

DATE : AUGUST 1978

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST.	STATE	COUNTY	CONGR DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY | MO | YR
CT	252	NED	CT	003	01				MERIMERE RESERVOIR DAM	4134.0	7249.4	18AUG78

POPULAR NAME	NAME OF IMPOUNDMENT
	MERIMERE RESERVOIR

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	08	STOCKING BROOK	KENSINGTON	5	6000

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
REPG	1870	S	31	30	1220	1080	NED	N	N	N	N	17AUG78

REMARKS

D/S HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	717	C	31	475	25000											

OWNER	ENGINEERING BY	CONSTRUCTION BY
CITY OF MERIDEN CT	CITY OF MERIDEN CT	

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE DAY | MO | YR	AUTHORITY FOR INSPECTION
STORCH ENGINEERS	25JUL78	PL92-367

REMARKS